Citation:

Woo J, Cheung B, Sham A, Lam TH. Influence of dietary pattern on the development of overweight in a Chinese population. Eur J Clin Nutr. 2008 Apr; 62(4):480-7.

PubMed ID: 17327865

Study Design:

Prospective cohort

Class:

B - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To examine dietary factors predisposing to overweight and obesity, taking into account age, gender, education level and physical activity.

Inclusion Criteria:

Ethnic Chinese men and women in a territory wide cardiovascular risk factor study undergoing physical exam and dietary assessment.

Exclusion Criteria:

Subjects who did not return for repeat physical examination 5-9 years later.

Description of Study Protocol:

Recruitment

- Subjects were contacted by random telephone survey and invited to have a physical exam and blood test.
- Dietary assessment was carried out consecutively on the attendees until 100 subjects in each age and sex groups from less than or equal to 34 years of age and more than or equal to 55 years of age (mean age 45.6+/- 11.7 years) were recruited.
- Five to 9 years later, subjects were again invited to have a repeat physical examination.

Design: prospective cohort study

Blinding used (if applicable)

n/a

Intervention (if applicable)

n/a

Statistical Analysis

- X_2 Test was used to compare the number of subjects with overweight or obese between different age and sex groups.
- Logistic regression adjusting for sex, age, education and physical activity were performed to assess the association between the normal and the overweight group.
- A $P<0.05$ was used to denote significant differences.

Data Collection Summary:

Timing of Measurements

- Dietary survey, physical exam and blood tests were carried out from October 1995- May 1996.
- Between 2000 and 2004 the original cohort was invited to re-attend for a repeat physical exam.

Dependent Variables

- Change in BMI
  - Incidence of overweight (BMI $\geq$ 23 -Asian criteria for overweight and BMI $\geq$ = 25 - WHO criteria for overweight) and obesity (BMI $\geq$ 30- WHO criteria).

Independent Variables

- Dietary intake: macronutrient intake, Mediterranean diet score, and Dietary Quality Index-International
  - Dietary assessment was carried out using food frequency questionnaire and grouped into categories: bread/pasta/rice, vegetables, fruits, meat/fish/eggs, beverages, dimsum/snacks, soups and oil/salt/sauces. Whenever possible, subjects were told before the visit that a survey on a week's diet would be completed and were advised to make a brief record at home to help the interview.
  - Quantitation of nutrients was carried out using food tables for Hong Kong and food tables used in China.
  - Evaluation of diet included: adherence to the Mediterranean diet; food variety ratio and the Dietary Quality Index-international (DQI-I). Four major aspects of the diet are assessed by DQI-I: variety, adequacy, moderation and overall balance. Range is 0-100, with high score representing high quality. Food variety ratio was defined for the Hong Kong population as the ratio of variety of snack to the to the variety of grains and meat.

Control Variables

- Physical activity was assessed by asking subjects how many times in the past month did they carry out exercise/sports activities for 30 minutes or more. Activity was graded as sedentary,

light, moderate and vigorous.
- Age
- Sex
- Education

Description of Actual Data Sample:

Initial N: 1,010 (number of men and women not stated)

Attrition (final N): 732 (72.4% of original group). 347 men and 385 women.

Age: Mean 45.6 +/- 11.7 years

Ethnicity: Ethnic Chinese

Other relevant demographics: none

Anthropometrics: There were slightly more men and more subjects in the two extreme age groups among those lost to follow up.

Location: Hong Kong

Summary of Results:

Key Findings:

For men:

- The 5-9 year incidence of overweight is 22.6% for BMI ≥ 23 (95% CI 15.0-30.1%)
- The 5-9 year incidence of overweight is 11.5% for BMI ≥ 25 (95% CI 7.3-15.7%)
- The 5-9 year incidence of obesity is 0.6% for BMI ≥ 30 (95% CI -0.2-1.4%)

For women:

- The 5-9 year incidence of overweight is 14.1% for BMI ≥23 (95% CI 8.8-19.5%)
- The 5-9 year incidence of overweight is 9.7% for BMI ≥ 25 (95% CI 6.6-13.4%)
- The 5-9 year incidence of obesity is 3% for BMI ≥30 (95% CI 1.3-4.8)

Using overweight criteria of BMI ≥ 23, significantly more men became overweight compared with women. However, the incidence of obesity is about five times higher in women compared with men.

In multivariate analysis, after adjusting for confounding factors (age, sex, education, and physical activity), increased variety of snacks and food variety ratio were associated with increased risk for developing overweight (BMI ≥ 23). No associations with any of these variables were observed for the BMI ≥ 25 group.

Other Findings

Author Conclusion:

- Increased variety of snack consumption may predispose to weight gain over a 5-9 year period.
- Food frequency questionnaire rather than 24 hour recall may have overestimated intake.
- Only about 70% of original cohort was available for follow up.

Reviewer Comments:

Subjects were told ahead of time that a survey on a week's diet intake would be taken, potentially altering subjects eating habits for that week.

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions

1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	N/A
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	N/A

Validity Questions

1.	**Was the research question clearly stated?**	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	**Was the selection of study subjects/patients free from bias?**	Yes
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes

2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	No
2.4.	Were the subjects/patients a representative sample of the relevant population?	Yes
3.	**Were study groups comparable?**	Yes
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	Yes
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	N/A
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	Yes
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	Yes
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	Yes
4.1.	Were follow-up methods described and the same for all groups?	Yes
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	Yes
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	???
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	Yes
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	Yes

5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	Yes
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	Yes
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	N/A
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	N/A
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	Yes
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	Yes
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes
7.7.	Were the measurements conducted consistently across groups?	Yes

8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**		Yes
	8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
	8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
	8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
	8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	Yes
	8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
	8.6.	Was clinical significance as well as statistical significance reported?	Yes
	8.7.	If negative findings, was a power calculation reported to address type 2 error?	N/A
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**		Yes
	9.1.	Is there a discussion of findings?	Yes
	9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**		Yes
	10.1.	Were sources of funding and investigators' affiliations described?	Yes
	10.2.	Was the study free from apparent conflict of interest?	Yes